SUBCOURSE **EDITION**
EN5483 **B**

US ARMY ENGINEER CENTER AND SCHOOL
DIRECT THE EMPLOYMENT OF ENGINEERS

"LET US TRY"

THE ARMY INSTITUTE FOR PROFESSIONAL DEVELOPMENT

ARMY CORRESPONDENCE COURSE PROGRAM

AIPD

READINESS / PROFESSIONALISM

THRU GROWTH

DIRECT THE EMPLOYMENT OF ENGINEERS

Subcourse Number EN5483

EDITION B

United States Army Engineer School
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SUBCOURSE OVERVIEW

Army operations doctrine is offensive in nature and requires commanders to seize the initiative at every opportunity. Engineers help a maneuver force execute doctrine regardless of command and support relationships. During your career, you will be a brigade staff officer, a battalion staff officer, a task force (TF) engineer, or a division engineer company commander. You will task-organize engineers, recommend command and support relationships, and establish command and control (C^2) while conducting the mission. This subcourse addresses how the engineer staff officer or commander employs engineers to support a maneuver force that is engaged in combat operations. It also teaches the student how to plan the efficient use of engineer assets.

Lesson 1 teaches engineer organizational principles and the task-organization process; both are crucial elements in task-organizing engineers.

Lesson 2 discusses command and support relationships and responsibilities for the logistical sustainment of engineer elements.

Lesson 3 addresses C^2 measures that must be established to follow and track mission progress and adjust task organization and responsibilities once the mission has begun. It also addresses how the division engineer company establishes a company forward tactical command post (TAC), a main command post (CP) tactical operations center (TOC), and a unit trains CP.

There are no prerequisites for this subcourse.

This subcourse reflects the doctrine that was current at the time it was prepared. In your own work situation, always refer to the latest official publications.

Unless otherwise stated, the masculine gender of singular pronouns is used to refer to both men and women.

TERMINAL LEARNING OBJECTIVE:

ACTION: You will identify engineer organizational principles, the task organization process, appropriate command and support relationships (including logistical sustainment responsibility), and C^2 measures used to employ engineers in support of maneuver. You will identify the process used by the TF engineer or the division engineer company commander to employ engineer elements in combat operations.

CONDITION: You will be given the material contained in this subcourse.

STANDARD: To demonstrate proficiency, you must attain a minimum score of 70 percent on the subcourse examination.

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LESSON 1

ENGINEER EMPLOYMENT PRINCIPLES

Critical Task: 01-2250-20-1003

OVERVIEW

LESSON DESCRIPTION:

This lesson addresses engineer organizational principles and the task-organization process essential for building a TF that can accomplish the mission.

TERMINAL LEARNING OBJECTIVE:

ACTION: You will identify the eight engineer organizational principles and the five steps involved in the task-organization process.

CONDITION: You will be given the material contained in this lesson.

STANDARD: You will correctly answer all questions on the practice exercise at the end of this lesson.

REFERENCES: The material contained in this lesson was derived from FMs 5-71-100, 5-100, and 101-5 and from other material approved by the USAES.

INTRODUCTION

As a division engineer company commander or a staff engineer preparing for battle, you must understand how the task-organization process facilitates and enhances engineer support of Army operation. Wartime missions often require that several units operate together as a combined-arms force. Standard guidelines help the commander and his staff accomplish this reorganization and the task-organization process. Engineer organizational principles were developed as a guide for the engineer officer who is responsible for task-organizing engineer elements to meet the diverse requirements of Army operations.

1-1. Imperatives of Army Operations. The tenets of Army operations-initiative, agility, depth, synchronization, and versatility-provide general guidance for conducting war. Ten imperatives support these tenets and provide key operating requirements for success on today's battlefield. Engineer operations help the commander meet the following imperatives:

a. Assure unity of effort. Commanders direct the use of available combat power toward clearly defined, attainable, and decisive goals.

Engineers recommend the best use of their units to achieve these goals. Force commanders then establish tasks and priorities for engineer activities.

b. Anticipate events on the battlefield. Engineer commanders provide timely, effective engineer support. A responsive logistics system makes materiel and transportation assets available for engineer units to prepare the terrain for the operation. Engineer plans include provisions for changes in the operation.

c. Concentrate combat power against enemy vulnerabilities. Effective force commanders and their engineers thoroughly understand the enemy and his weaknesses. Viable schemes of maneuver consider the capabilities of engineer forces to alter terrain, reduce enemy obstacles, hinder enemy breaching of friendly obstacles, and protect the force from enemy firepower. Engineer mobility operations enable the maneuver commander to exploit enemy vulnerabilities; countermobility operations protect the friendly force and conserve combat power.

d. Designate, sustain, and shift the main effort. Engineers are combat multipliers for the maneuver force's main effort. Maneuver supporting efforts receive fewer engineer resources. Engineer units concentrate in key areas, and everyone does not get an equal share of engineers. As the main effort shifts, the engineer force's posture enables engineers to shift with it.

e. Press the fight. Engineer units support the fight to the endurance limit of their men and machines. Prior planning allows commanders to position forces and materiel where they can be replaced when exhausted during the battle.

f. Move fast, strike hard, and finish rapidly. Engineers enable units to concentrate rapidly over clear routes and reduce enemy obstacles without losing momentum.

g. Use terrain, weather, deception, and operations security (OPSEC). Engineers are experts on the use of terrain and the effect of weather on terrain; they convert terrain to the commander's advantage.

h. Conserve strength for decisive actions. The number of available engineers is insufficient to meet all requirements. Commanders must focus engineers on mission-essential tasks. They must balance the decentralized employment of engineers into a close-combat force against the need to mass engineers for critical tasks.

i. Complement and reinforce the combined-arms team and sister services. When used properly, engineers are a combat multiplier that significantly increases the effectiveness of other combat arms. Engineer units are fully integrated into the combined-arms team. They also work with other services to ensure that the theater's infrastructure permits support to all forces.

j. Understand the effects of battle on soldiers, units, and leaders. The modern battlefield demands continuous operations. Engineer units maintain high levels of performance, although they are not structured for double shifts of operators and key personnel. Key personnel can become ineffective quickly due to stress, exertion, and loss of sleep. Engineer commanders must keep units effective and productive in this environment.

1-2. Engineer Organizational Principles. Engineer organizational principles complement tenets and imperatives of Army operations. Engineers must apply the following principles when developing the engineer architecture:

a. Task-organize engineer forces to meet requirements. Mission requirements drive the size and composition of engineer units. A mixture of units is often necessary to achieve the proper balance of capabilities, and the mixture can change as the operation progresses. Commanders task-organize engineer units based on the tactical estimate. An engineer company can receive a maximum of two additional engineer platoons, and an engineer battalion can receive a maximum of two additional engineer companies. The companies can be a mixture of corps and division elements operating under corps or division engineer headquarters.

b. Give priority to the main effort.

(1) The number of available engineers on the battlefield is insufficient to handle all tasks.

(2) Engineers are concentrated with the main effort to assure its success, and they are usually required to accept risk elsewhere.

(3) The engineer restructure initiative (ERI) changed the engineer force structure-an armored division now has an engineer brigade. The engineer brigade increased the engineer capability within the division so an engineer battalion can support each maneuver brigade. Under most conditions, the division engineer battalion headquarters trains and operates continually with its associated ground maneuver brigade (this does not preclude task-organizing). When supporting the maneuver brigade's main effort, the division engineer battalion may have additional elements assigned from the division engineer brigade or corps. If this happens, the normally associated engineer battalion commander remains in command of engineers supporting the brigade. The additional engineer battalion commander and his staff assist the associated commander in detailed planning. When supporting a secondary effort, elements of the division engineer battalion may be detached and attached to another engineer battalion.

When operating at the TF level, the associated engineer company commander is the TF engineer if an additional engineer company is task-organized to the TF. The additional engineer company commander and his staff assist the TF in detailed planning.

c. Integrate engineers with fire and maneuver. Fire and maneuver form a triad with mobility and countermobility, because neither fire nor maneuver is truly effective if the combat formation cannot move at will and deny freedom of maneuver to the enemy.

(1) The scheme of maneuver governs the engineer plan. Table 1-1 shows the five primary engineer functions integrated with the scheme of maneuver.

- Mobility enables the force commander to maneuver tactical units into positions of advantage over the enemy.
- Countermobility augments natural terrain with obstacle systems according to the commander's concept.
- Survivability provides concealment from the enemy and protective shelter from the effects of enemy weapons.
- General engineering provides a deployed force with construction capability, lines of communication (LOC) maintenance and repair, airfield damage repair, battle damage restoration, and minefield clearing.
- Topographic engineering provides commanders with information about the terrain so they can use the ground effectively.

Table 1-1. Engineer battlefield functions.

Mobility	Countermobility	Survivability	General Engineering	Topographic Engineering
Countermine/ counterobstacle	Mine systems	Fighting positions	LOC maintenance and repair	Terrain analysis
Gap crossing	Obstacle development	Protective emplacement	Logistics facilities support	Map production
Forward aviation combat engineering		Protective-support facilities	Area-damage control	Precision survey
		Camouflage	Construction materials production	

(2) Engineer forces are task-organized so quick transitions can be made to subsequent phases. Normal relationships between engineers and maneuver unit ease the many required transitions. The engineer force's ability to react quickly to changing situations depends on its position before the battle. Normally, there is insufficient time to radically restructure the engineer organization for combat or to move engineers across the battlefield after they join the battle. Placing

most of the engineer assets forward is critical to the operation's success. Engineers integrate mobility and countermobility by fighting well forward in the combat zone along with the division units on the forward line of own troops (FLOT). The engineers' orientation is forward, and all their work provides essential support to the forward fight.

(3) Engineer units are never held in reserve, and commanders use them for other things when supporting a reserve maneuver unit. However, force commanders must realize that future operations can be impaired if engineer units are given insufficient time to refit and regroup before they are tasked to support a committed maneuver unit. Engineers are often used for critical tasks until the last possible moment and then face the difficult task of traveling to another location to join a force already committed. Commanders must resist this tendency and allow engineer units at least 12 hours to prepare for commitment. As the TF engineer, you must inform the force commander of this requirement.

d. Ensure that current engineer operations promote future operations.

(1) Engineers must start work early so the mission will be completed on time. They must anticipate future missions and reposition their units, if necessary, while accomplishing the current mission.

(2) The engineer effort must accomplish the immediate mission and fit into the commander's long-term intent. For example, a TF engineer anticipating and planning a counterattack is still involved in supporting a defensive operation. If he knows that the commander intends to counterattack, he must start preparing as soon as possible.

e. Do not hold engineers in reserve.

(1) Engineer units should remain in the fight and be out only long enough to refit after a major action.

(2) Prior planning helps an engineer unit make a timely return after it has been taken out of action and assures adequate integration and preparation for continuing the fight.

f. Build a logistically sustainable force.

(1) Remember that resources are always limited. Materiel, transportation assets, and time affect the ability to execute plans.

(2) Plan engineer-unit sustainment and the supporting logistics structure in detail. Logistics limitations may restrict the size of the usable engineer force.

(3) Figure 1-1 shows how one division engineer company might pick up supplies. The division engineer battalion is a good place to examine this principle more closely. The task organization and maneuver unit support relationships of the division engineer battalion, and companies determine the scheme of logistical support. If the division engineer companies are in a support relationship, the division engineer battalion uses the logistical packaging (LOGPAC) system to support the companies. If the division engineer companies are in a command relationship with the supported unit, the maneuver unit must incorporate them into the maneuver units LOGPAC system. Each division engineer company and separate element in the division engineer battalion has a LOGPAC system. Each element integrates their LOGPAC into the maneuver LOGPAC resupply system and moves forward to a specified logistical release point (LRP) for routine resupply. The Supply Officer (US Army)(S4) works in conjunction with the headquarters and headquarters commander and each company executive officer (XO) to determine LRP locations. LRPs are located well forward based on the tactical situation.

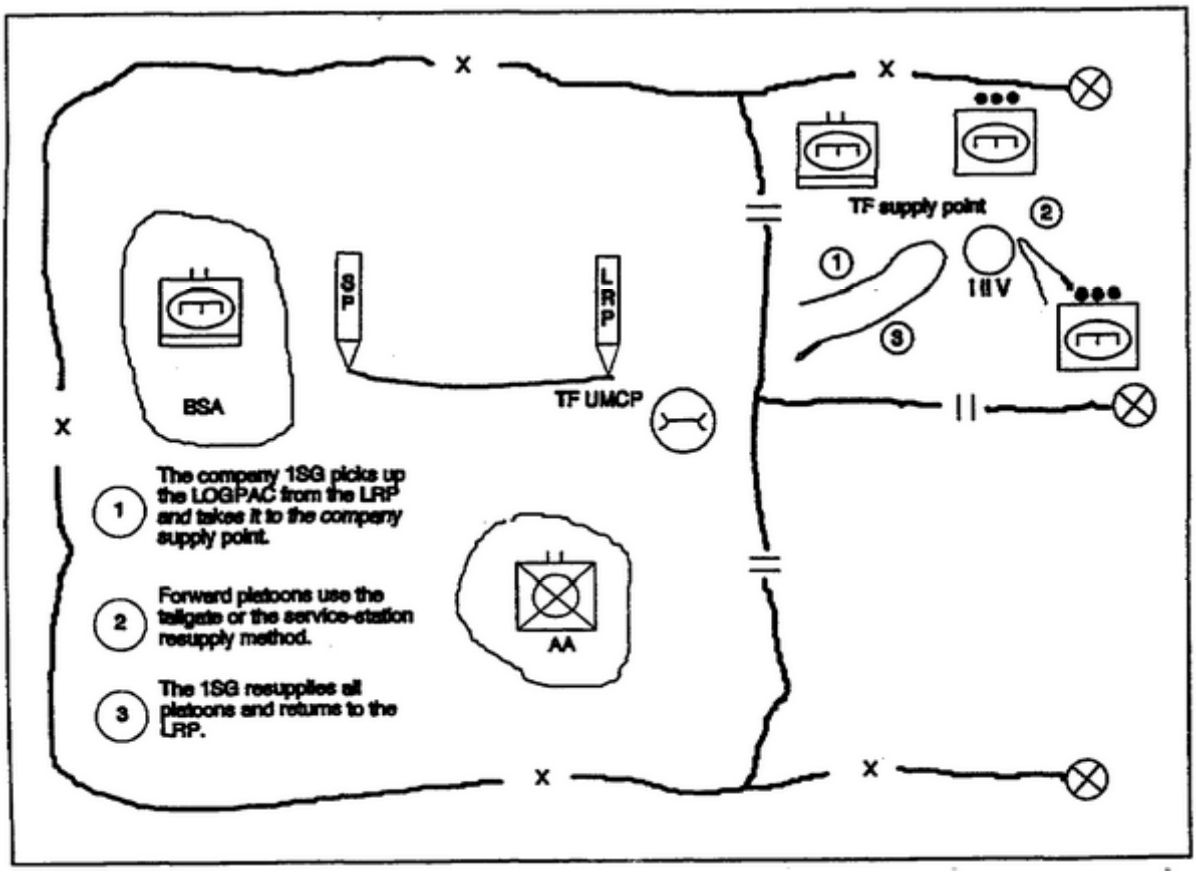

Figure 1-1. Combat service support laydown (one division engineer company).

g. Maintain effective C^2. Effective plans make use of all available engineer headquarters, align the headquarters with maneuver boundaries, and smoothly transfer operation between the two.

h. Use local resources.

(1) Engineer resources of local governments, other services, and allied forces are in every theater. At the tactical level this often requires improvising to convert on-site materiel and equipment to military use. At higher levels, host-nation resources are well-suited for sustaining engineer support in rear areas.

(2) Local resources augment available engineers while releasing more engineer units forward to the combat zone.

1-3. Task-Organization Process. The first section of the operational order (OPORD) outlines the task organization of the force. The task organization shows the internal organization of the force and depicts each unit in a command or a support relationship. Use the following process to task-organize engineer elements:

a. Identify tasks.

(1) Identify specified and implied task requirements by maneuver headquarters during the mission-analysis phase of the engineer estimate. Derive specified tasks (obstacle zones, obstacle belts with intents, required number of breach lanes, and the type of breach) from the warning order (WO) or OPORD and the higher commander's intent. Develop implied tasks by analyzing the mission with available facts and assumptions. When attacking to seize an objective across a river, crossing the river is a classical implied task.

(2) Develop essential tasks based on mission requirements and force priorities. Identify specified and implied tasks as essential tasks if they are critical to mission success. As a staff engineer, do not ignore the other specified and implied tasks, but center your planning on identified essential tasks.

b. Identify follow-on and be-prepared tasks.

(1) For example, when an engineer unit supports a defensive operation, it should plan and anticipate the support of a counterattack if one occurs.

(2) Remember, whatever engineers do must accomplish the immediate mission and fit into the commander’s long-term intent.

c. Allocate engineer forces against tasks.

(1) You must allocate engineer elements (platoon, blade teams, and assault and obstacle (A&O) sections) to accomplish specific tasks.

(2) Each maneuver level requires a responsive engineer force even though emphasis and effort are pushed forward. The wide variety of engineer units provides flexibility when building the engineer structure to meet the needs of the command. Tasks occur at every echelon of command within the theater of operations (TO). Engineer elements are allocated from the theater to individual TF platoons. Engineer commands (ENCOMs) are the C^2 headquarters for engineer units assigned or attached to theater armies. Their primary concern is the theater sustainment base, including the requirements of other services and allied military forces. These commands plan, coordinate, and supervise construction. Their primary role is to ensure that engineer support in the communications zone (COMMZ) meets the needs of the forces in the combat zone. Engineer brigades, groups, battalions (combat, combat (heavy), topographic, bridge, and support) and separate companies are tailored to operate within the TO in support of the maneuver force. These engineer units are most responsive at their designed operation level.

(3) You should mass specialized elements, such as A&O sections, into a specialized unit when appropriate. When specialized units are formed, logistical slices must also accompany them for sustainment.

d. Overlay engineer headquarters elements on the allocated engineer elements for their C^2.

(1) An engineer headquarters should never be left idle.

(2) A single controlling engineer does not have to support a maneuver commander if the maneuver commander has a staff engineer.

(3) A platoon leader can control-

- A reinforced division engineer or a combat engineer platoon.

- Three division engineer squads and two combat engineer squads with equipment augmentation (combat engineer vehicle (CEV), armored vehicle-launched bridge (AVLB), mine-clearing line charge (MICLIC), and armored vehicle-launched MICLIC (AVLM)).

(4) An engineer company commander can control two to five division engineer, combat engineer, or maneuver platoons plus additional A&O sections.

(5) A battalion commander can control two to six division engineer, combat engineer, or maneuver companies plus additional A&O platoons or sections.

e. Establish command and support relationships.

(1) Command authority for engineer units should be given to a maneuver commander when he requires engineer forces that are responsive immediately. The support relationship depends on the type of control designated by the force commander.

(2) Choosing a command and a support relationship depends on mission, enemy, terrain, troops, and time available (METT-T). Attachment and operational control (OPCON) are the primary command relationships used at division level and below. These relationships suit fluid situations such as exploitations and pursuits. A direct support (DS) relationship (*a decentralized method of control that takes away the tasking commander's flexibility*) is appropriate when the subordinate maneuver commander needs a higher degree of responsiveness from engineers than that allowed by a general support (GS) relationship (*a relationship that allows the tasking commander to maintain centralized control over the tasked unit*) but does not need task-organization authority. A higher headquarters often uses a DS relationship when it anticipates a change to the engineer task organization that requires shifting engineer units to other locations. Engineers in a GS relationship provide support to the force on an area basis rather than to a specific unit. Centralized control is maintained over the engineer units because-

- It is the most economical and efficient method of giving maximum support to each maneuver unit.
- It allows the engineer to rapidly shift support from one unit to another as the battle unfolds.
- It gives the maneuver commander more flexibility when the situation is uncertain so that the parent engineer unit can easily reinforce the DS engineer elements with personnel and equipment.

(3) The normal division engineer battalion relationship with a maneuver brigade is a command relationship. Task-organize the division engineer battalion to the maneuver brigade under OPCON for less than 48 hours; otherwise, attach the unit to the supported brigade. OPCON requires minimal coordination to assure logistical support of common classes of supply, because normal, habitual training relationships are already established. The norm for a division engineer company relationship with a TF is OPCON in the offense and DS in the defense. Division engineer platoons should remain under the division engineer company commanders control; however, the division engineer company commander may place a division engineer platoon in DS to the maneuver company team for a specific period or mission during breaching operations. When a division engineer platoon is the highest headquarters supporting a maneuver

TF, attach the division engineer platoon to the TF. (Lesson 2 covers command and support relationships in detail.)

1-4. Summary. This lesson has examined engineer organizational principles and their application in the task-organization process. You have learned that engineer organizational principles were developed as a guide for the engineer officer who must task-organize engineer elements to meet the diverse requirements of Army operations. Remember, engineer organizational principles were derived from doctrine imperatives of Army operations, and these imperatives guide the organization of engineer forces. You must be able to identify the eight engineer organizational principles and the procedures involved in the task-organization process.

LESSON 1

PRACTICE EXERCISE

The following items will test your grasp of the material covered in this lesson. There is only one correct answer for each item. When you complete the exercise, check your answer with the answer key that follows. If you answer any item incorrectly, restudy the part of the lesson that contains the portion involved.

1. List the eight engineer organizational principles.

2. List the five steps involved in the task-organization process.

3. List the five tenets of Army operations doctrine.

4. List the ten imperatives of Army operations doctrine and briefly describe each one.

LESSON 1

PRACTICE EXERCISE

ANSWER KEY AND FEEDBACK

Item	Correct Answer and Feedback

1. The eight engineer organizational principles are-

   - Task-organize engineer forces to meet requirements.
   - Give priority to the main effort.
   - Integrate engineers with fire and maneuver.
   - Ensure that current engineer operations promote future operations.
   - Do not hold engineers in reserve.
   - Build a logistically sustainable force.
   - Maintain effective C^2.
   - Use local resources.

   (page 1-3, para 1-2)

2. The five steps involved in the task-organization process are-

   - Identify tasks.
   - Identify follow-up and be-prepared tasks.
   - Allocation engineer forces against tasks.
   - Overlay engineer headquarters elements on the allocated engineer elements for their C^2.
   - Establish commend and support relationships.

   (page 1-7, para 1-3)

Item Correct Answer and Feedback

3. The five tenets of Army operations doctrine are-

- Initiative.
- Agility.
- Depth.
- Synchronization.
- Versatility.

(page 1-1, para 1-1)

4. The ten imperatives of Army operations doctrine are-

- Assure unity of effort. Commanders direct the use of available combat power toward clearly defined, attainable, and decisive goals. Engineers recommend the best use of their units to achieve these goals. Force commanders then establish tasks and priorities for engineer activities.
- Anticipate events on the battlefield. Engineer commanders provide timely, effective engineer support. A responsive logistics system makes materiel and transportation assets available for engineer units to prepare the terrain for the operation. Engineer plans include provisions for changes in the operation.
- Concentrate combat power against enemy vulnerabilities. Effective force commanders and their engineers thoroughly understand the enemy and his weaknesses. Viable schemes of maneuver consider the capabilities of engineer forces to alter terrain, reduce enemy obstacles, hinder enemy breaching of friendly obstacles, and protect the force from enemy firepower. Engineer mobility operations enable the maneuver commander to exploit enemy vulnerabilities; countermobility operations protect the friendly force and conserve combat power.
- Designate, sustain, and shift the main effort. Engineers are combat multipliers for the maneuver force's main effort. Maneuver supporting efforts receive fewer engineer resources. Engineer units concentrate in key areas, and everyone does not get an equal share of engineers. As the main effort shifts, the engineer force's posture enables engineers to shift with it.
- Press the fight. Engineer units support the fight to the endurance limit of their men and machines. Prior planning allows commanders to position forces and materiel where they can be replaced when exhausted during the battle.

Item Correct Answer and Feedback

- Move fast, strike hard, and finish rapidly. Engineers enable unit to concentrate rapidly over clear routes and reduce enemy obstacles without losing momentum.

- Use terrain, weather, deception, and OPSEC. Engineers are experts on the use of terrain and the effect of weather on terrain; they convert terrain to the commander's advantage.

- Conserve strength for decisive actions. The number of available engineers is insufficient to meet all requirements. Commanders must divert engineers to mission-essential tasks. They must balance the decentralized employment of engineers into a close-combat force against the need to mass engineers for critical tasks.

- Complement and reinforce the combined-arms team and sister services. When used properly, engineers are a combat multiplier that significantly increases the effectiveness of other combat arms. Engineer units are fully integrated into the combined-arms team. They also work with other services to ensure that the theater's infrastructure permits support to all forces.

- Understand the effect of battle on soldiers, units, and leaders. The modern battlefield demands continuous operations. Engineer units maintain high levels of performance, although they are not structured for double shifts of operators and key personnel. Key personnel can become ineffective quickly due to stress, exertion, and loss of sleep. Engineer commanders must keep units effective and productive in this environment.

(page 1-1, para 1-1)

LESSON 2

COMMAND AND SUPPORT RELATIONSHIPS

Critical Task: 01-2250-20-1003

OVERVIEW

LESSON DESCRIPTION:

This lesson addresses command and support relationships and their logistical responsibility. Command relationships determine the chain of command and the authority a maneuver commander has over an engineer unit. Support relationships dictate the manner of support a maneuver commander receives and determine logistical responsibility, if any, to supporting engineer elements.

TERMINAL LEARNING OBJECTIVE:

ACTION: You will identify command and support relationships, including logistical responsibility, associated with the C^2 of engineer elements. You will be able to differentiate between command and support relationships used in combat situations and those used in permanent situations.

CONDITION: You will be given the material contained in this lesson.

STANDARD: You will correctly answer all questions on the practice exercise at the end of this lesson.

REFERENCES: The material contained in this lesson was derived from FMs 5-71-100, 5-100, and 101-5 and from other material approved by the USAES.

INTRODUCTION

As the final step of the tactical-planning process, the engineer staff officer or commander recommends appropriate command and support relationships between engineers and maneuver units. Each situation is unique and requires its own solution. Engineer commanders are always responsible for tasks undertaken by their subordinate elements. This lesson covers elements of command and support relationships that may exist between maneuver and engineer elements. It also addresses the authority and the logistical responsibility inherent in those relationships. Engineer officers must fully understand the functions of these relationships and know how to use them to enhance engineer capability during maneuver support and battle. You will learn to base command and support relationships on the commander's tactical plan and the assessment of each unit's contribution to the plan.

2-1. Command Relationships. Command relationships prescribe the chain of command and the authority a commander has over an engineer unit.

a. Organic. Organic units are a permanent part of a larger unit. The parent unit exercises full C^2 over them. Division engineer battalions and separate brigade engineer companies are organic to the parent unit.

b. Assigned. Assigned units are under the C^2 of a higher headquarters (usually above division level) on a relatively permanent basis. Engineer units of an ENCOM are assigned to the theater army.

c. Attached. Attached units are under the C^2 of a gaining commander unless limitations are imposed by the attachment order. The commander's authority and responsibility is the same as that for organic and assigned units, except personnel transfer and promotion remain under the units parent organization. The gaining commander is also responsible for logistical support of the attached engineer unit.

d. OPCON. OPCON units are under the gaining commander's C^2, and the parent unit retains responsibility for administrative and logistical support. The gaining commander can use the engineer unit as he would attached engineers without the burden of making logistical arrangement. Within the North Atlantic Treaty Organization (NATO), an allied formation commander does not have the authority to assign separate employment of OPCON engineer unit components from another national army. An engineer unit that is OPCON to an allied formation cannot be task-organized by the formation commander.

e. Operational command (OPCOM). OPCOM units are under the United States (US) unified or specified commanders C^2, and the parent unit retains responsibility for administrative and logistical support. In NATO, OPCOM gives a commander the authority to assign missions or tasks, deploy units, reassign forces, and retain or delegate operational and tactical control.

2-2. Support Relationships. Support relationships show the manner of support a commander receives. Command, administrative, and logistical responsibilities remain with the parent engineer unit.

a. DS. Engineers in a DS relationship provide dedicated support to a specific unit. The supported commander assigns tasks directly to the engineer unit and these tasks have priority over those from its parent headquarters. Command, administrative and logistical responsibilities remain with the parent engineer unit which employs engineer subunits to efficiently accomplish mission tasks. A DS relationship preludes further task organization of the engineer unit by the supported maneuver commander.

b. GS. Engineers in a GS relationship provide support to the force on an area basis instead of providing support a specific unit. Units request support through the area commander on a task-by-task basis. The commander then establishes priorities and assigns the task to an engineer unit.

c. Centralized and decentralized control. A discussion of offensive and defensive considerations is necessary to better understand centralized and decentralized forms of control.

(1) Offensive. Mobility is the primary offensive engineer function, so most division engineers are task-organized in command relationships with forward elements. The leading TFs of both the main-effort brigade and its supporting brigades usually receive a division engineer battalion. This battalion is almost totally oriented on mobility and rapid breaching and assault support. Its assets provide countermobility obstacles that protect the maneuver force's flank.

(2) Defensive. Maneuver forces can use a mobile or an area defensive scheme or a combination of both, depending on METT-T factors. Engineer operations differ based on the selected pattern.

(a) Mobile.

- Mobile defenses employ a combination of offensive, defensive, and delaying action to defeat the enemy attack. Their exact design varies from case to case and must be described in each instance. Commanders who conduct mobile defense deploy small forces forward and use maneuver supported by fire and obstacles to wrest the initiative from the attacker after he has entered the defended area.

- The force’s mobility must equal or exceed the enemy's mobility. It must form a large reserve to conduct a decisive counterattack. A mobile defense is designed for the temporary loss of some terrain with the thinning of committed enemy forces. It allows the large reserve to destroy remaining enemy forces in the counterattack.

- Division and larger formations normally conduct mobile defense; however, large brigades and cavalry regiments can conduct mobile defense in some circumstances. Armored forces are required for the reserve and can be used as security forces or to contain anticipated penetrations. Light forces usually hold strongpoints in suitable terrain within or adjacent to the area of the enemy's penetration; or in some cases, they stop the enemy during the counterattack.

- Engineer planning is highly centralized to ensure that obstacle zones and belts support the planned maneuver. Engineer execution, in contrast is decentralized. Each TF requires an OPCON division engineer company that responds to rapid movements

and changes in the mission. Decentralized engineers also execute required offensive actions.

- Division engineer brigades cannot retain standard engineer reaction capability. Engineer forces have difficulty supporting a mobile defense unless the force commander attaches the engineers of the corps reserve division forward to the defending division.

(b) Area

- Area defense denies the enemy access to specific terrain for a specified time and is usually required when a defending force is predominantly light. It does not destroy the attacking force but presumes another simultaneous or subsequent operation to defeat the enemy.

- Most of the defending force is deployed to retain ground. It uses a combination of defensive positions and small mobile reserves, and force commanders organize the defense around the static framework provided by defensive positions. Area-defense forces destroy the enemy by interlocking fires or counterattacking enemy units that penetrate between defensive positions.

- The depth of area defense depends on the mission available forces, and the nature of the terrain. When necessary, the commander locates the main effort well forward and commits most of the combat power to the forward edge of the battle area (FEBA). He attacks when enemy forces are along or beyond the FEBA. A forward defense may be necessary, but it is more difficult to execute than a defense in greater depth. It depends on rapid identification of and concentration against the enemy's main effort.

- Engineer planning is very decentralized. Each subordinate maneuver unit is given an area to defend, and the unit must plan its own defense. Large obstacle zones and belts provide the defender with maximum flexibility when organizing a positional defense.

- Allocation of engineer assets and resources is based on command priorities and the threat, and the majority of the engineer effort is under centralized control. The remaining engineers perform flank or rear-area tasks. GS provides additional engineer effort to supported units based on the commander's priorities. In a GS

relationship, the force commander can move his engineer units and use them more readily than if he had tasked them to a subordinate commander in a more decentralized role, such as a command or a DS relationship.

2-3. Maneuver Commander's Authority. A maneuver commander cannot assign a more authoritative command relationship than he receives from a higher authority. He may assign a less authoritative relationship to further attach to, place under OPCON to, or give a support mission for a subordinate headquarters to an engineer unit attached to him. The maneuver commander may further place under OPCON to or give a support mission for a subordinate headquarters to an engineer unit OPCON to him. The commander may give tasks and priorities to an engineer unit in direct support to him, but he cannot task-organize it or give it to a subordinate headquarters.

2-4. Engineer Organization.

a. Corps engineer brigade.

(1) The corps engineer brigade is a large organization that contains the C^2 structure necessary to sustain a fully developed corps area of operations. It also contains specialized engineer units that support combat operations. The brigade can task-organize subordinate engineer units to accomplish current and future missions. It focuses on future operations to ensure that task organizations develop early and give engineer units sufficient time to move.

(2) Figure 2-1, page 2-6, shows a sample corps engineer brigade. It has three armored divisions, one light division, one separate armored brigade, and one armored cavalry regiment. The two combat engineer groups are flexible organizations that have no fixed number of battalions or separate companies. They are given GS engineer responsibility.

(3) The corps combat engineer battalion (mechanized, wheeled, and light corps) has three engineer companies, nine combat support equipment (CSE) companies, and one light equipment company (LEC). Ribbon bridge (RB) and medium girder bridge (MGB) companies are located at the brigade, and AVLBs are located in the division area. The corps engineer controls bridging and task-organizes it according to mission and corps priorities.

b. Armored division engineer.

(1) The division engineer concentrates on the fight and allocates division engineer companies to division engineer battalions that support forward maneuver brigades. The base engineer unit in the armored division organization is the division engineer battalion. The division engineer company organizes to fight with an armored battalion TF.

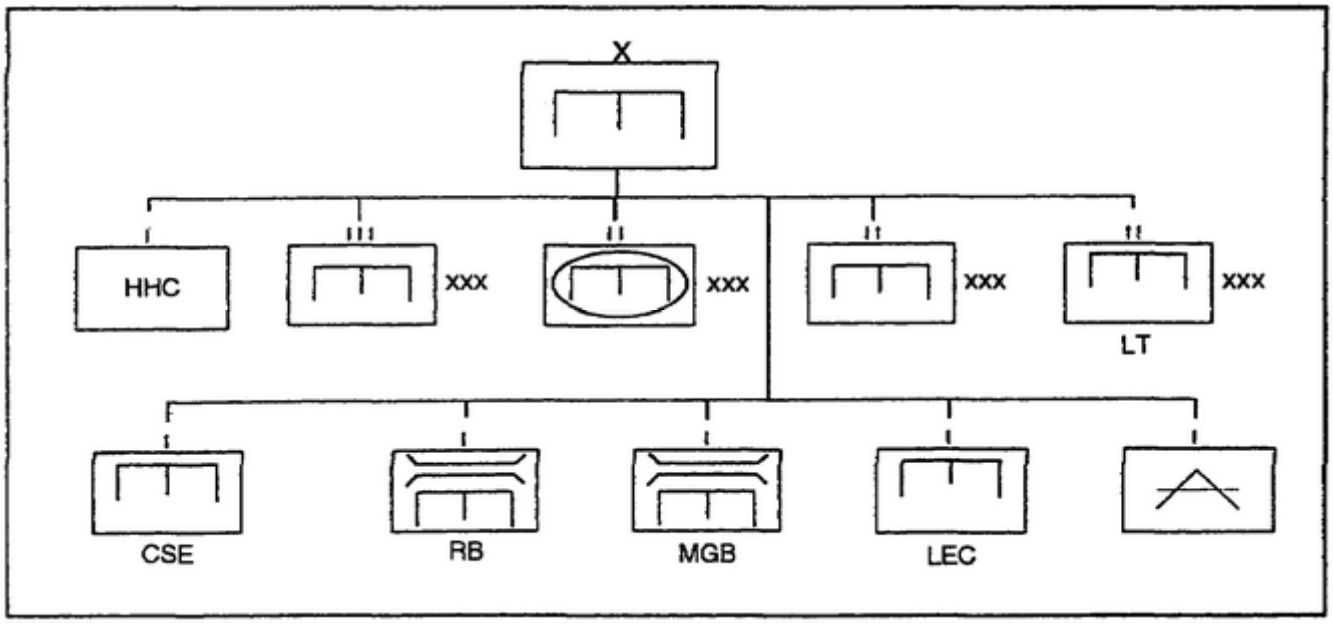

Figure 2-1. Corps engineer brigade.

It focuses on the offense and mans and equips itself to provide mobility and countermobility for flank obstacle protection, hasty survivability, and combat general engineer support.

(2) Figure 2-2 shows engineers organic to an armored division. These engineers replace the former organic division engineer battalion and the corps mechanized battalion normally associated with the division.

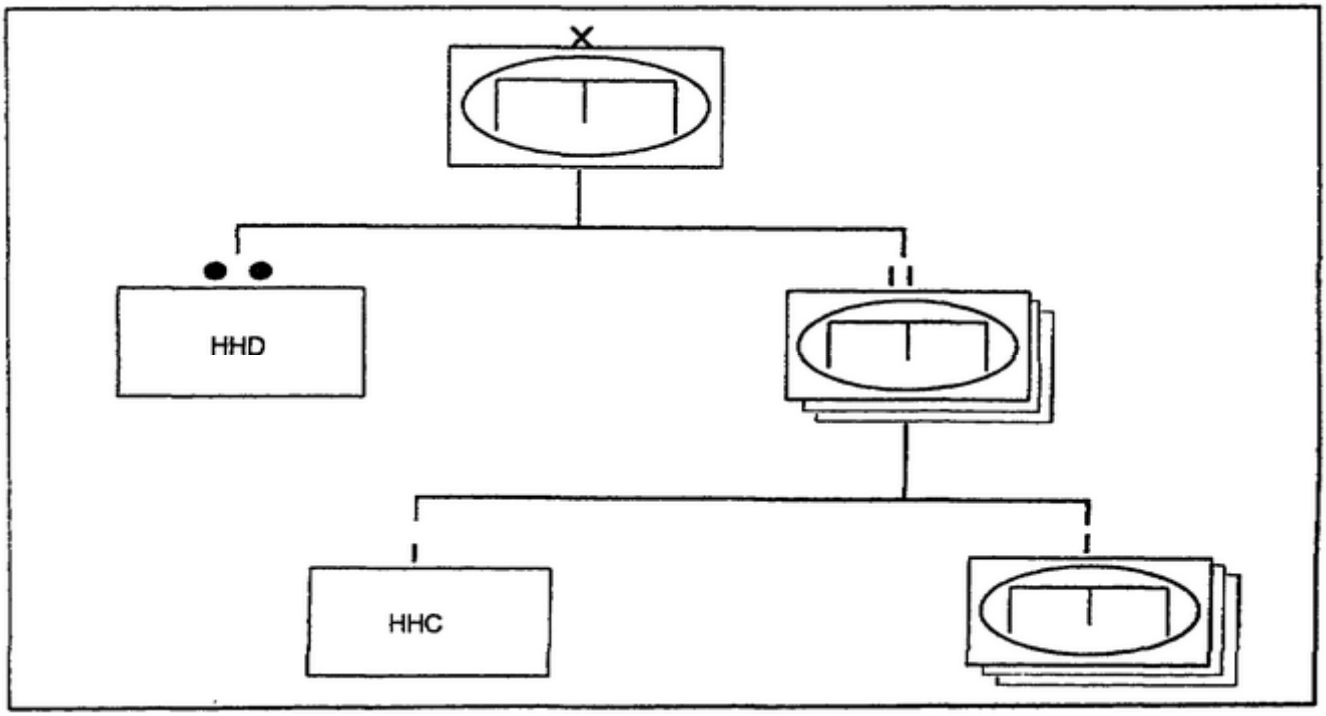

Figure 2-2. Division engineer organization.

2-5. Engineer Force Laydown.

a. Armored division area.

(1) Each maneuver brigade normally has an associated division engineer battalion. The division engineer battalion usually trains and operates with its associated ground-maneuver brigade. This battalion can have additional elements attached from other division engineer battalions or corps when supporting the main effort. It can also have elements detached from it and attached to another battalion when supporting a secondary effort.

(2) An armored division normally consists of ten maneuver battalions and a cavalry squadron. The number of division engineer companies is insufficient to habitually associate one with each ground maneuver battalion. Even brigades that have three maneuver TFs should not blindly give each TF a division engineer company if the tactical estimate does not support the allocation. Division mission-essential tasks help set up habitual association for division engineer companies. A maneuver brigade's main TF often has one or more division engineer companies in support, but other TFs have less. Weighting the engineer effort enables a maneuver brigade commander to retain flexibility when employing engineers and delegating tasks between engineers from TF through division level.

(3) Figure 2-3, page 2-8, shows an example of organic and corps engineers in an armored division area for a defensive operation. The division's main effort is in the north. The division cavalry squadron has a screen mission on the division's southern flank. The reserve brigade's anticipated employment is to counterattack in the north, and the engineer laydown supports this defense.

(4) The division engineer battalion that supports the main-effort brigade has an additional division engineer company from the reserve brigade. The main-effort division engineer battalion has four division engineer companies under its control. The battalion that supports the secondary effort has a company detached to support the cavalry covering force, which is the screen for the division. The battalion retains two subordinate companies for a total of four division engineer and two A&O platoons. The reserve brigade has a division engineer battalion minus one company that prepares for a counterattack in the assembly area and provides mobility and survivability the reserve brigade. A corps RB company is similarly positioned to rapidly move forward and support the reserve brigade's movement over a river. The division engineer brigade headquarters closely monitors engineer support to the reserve brigade and controls other engineer activity in the division rear area.

(5) A corps combat engineer battalion is in DS of the division and works on given tasks and priorities in the rear area. The CSE company

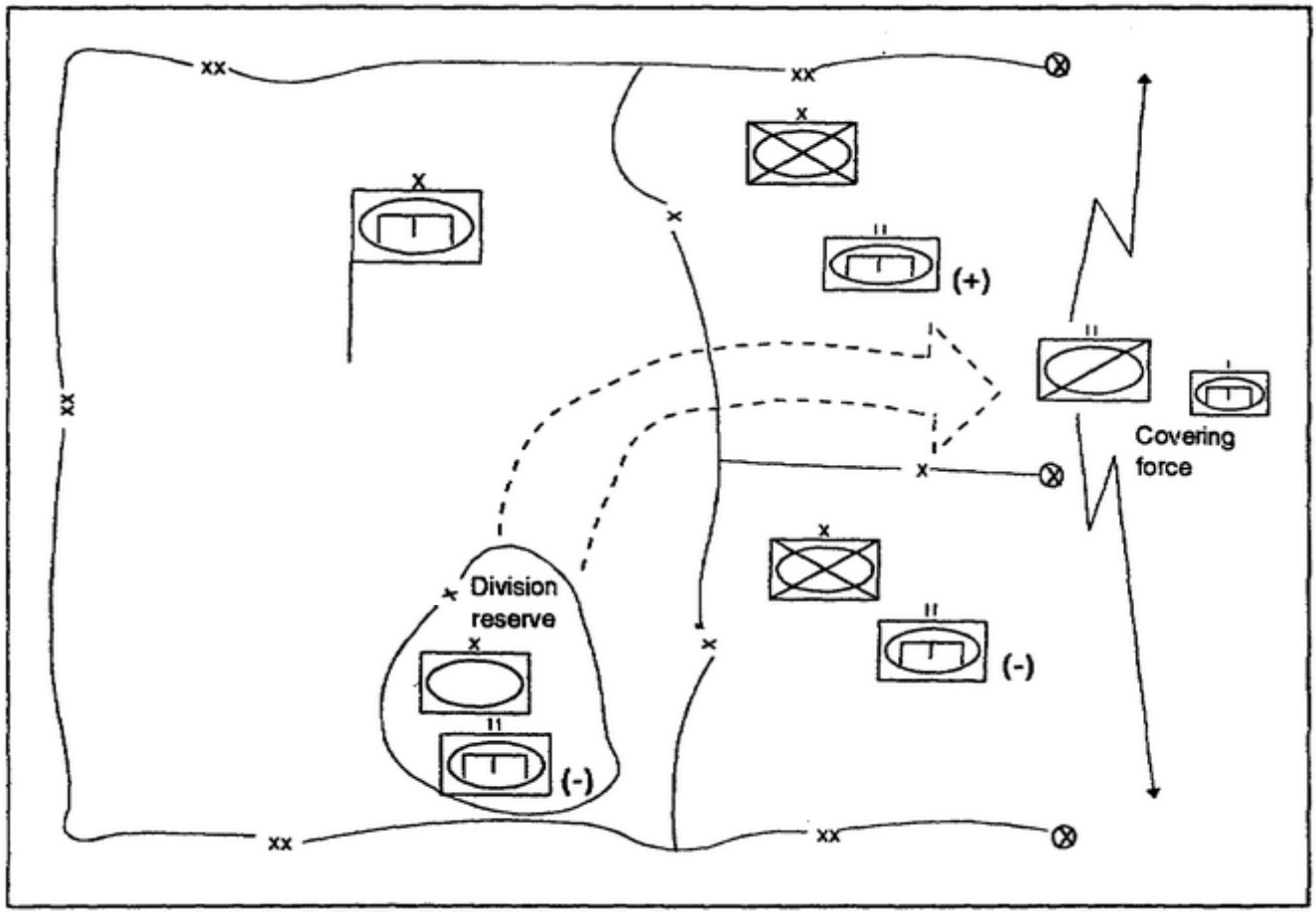

Figure 2-3. Division engineer brigade defense.

works under the supervision of the corps combat engineer battalion and maintains division supply routes from the corps rear to brigade support areas (BSAs) on a task-by-task basis. The corps MGB platoon works on a bridge task in the division area under the direction of the division engineer headquarters.

b. Corps area.

(1) The corps engineer brigade aligns combat groups to support units in the corps rear and committed divisions. These groups focus on general engineering and survivability support for corps rear-area elements. The engineer brigade assigns the area of responsibility to engineer groups in the corps rear. The groups conduct mobility, countermobility, survivability, and general engineering tasks for corps units within their assigned areas. They provide subordinate units to the division engineers in armored divisions as required and can maintain supply routes to BSAs on a task-by-task basis. Their bridge and CSE units operate as far forward as necessary.

(2) Figure 2-4 shows an example of an engineer group employed to support a corps offensive operation. The main effort is the center division with supporting attacks by the northern and southern divisions. One division follows in the center and assumes the main attack on order, and one division is the reserve and plans movement along routes behind the southern attacking division. A separate armored brigade follows and supports the northern attacking division. The organization of this brigade is similar to that of the division engineer battalion.

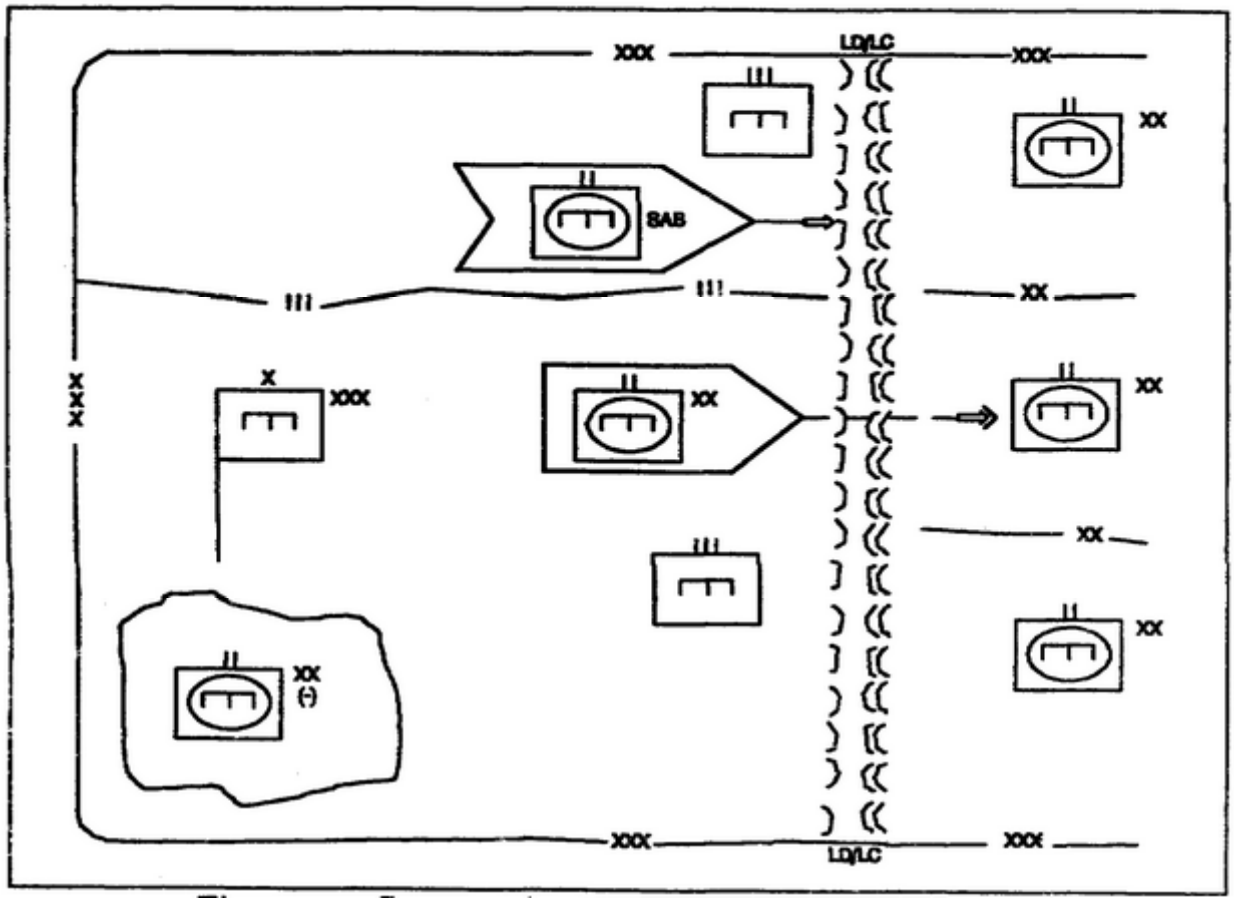

Figure 2-4. Corps engineer laydown (offensive scenario).

(3) The corps engineer assigns areas to combat engineer groups that perform engineer brigade duties from the corps rear boundary to the line of departure (LD). When possible, the boundary between engineer groups should align with the boundary between forward divisions.

(4) Division engineers clear routes from the LD forward as the attack progresses. When BSAs displace forward of the LD, corps combat engineer groups assume responsibility for supply routes forward of the LD to BSAs. They are responsible for other engineer support forward of the LD, and the support is coordinated with the division

engineer on a task-by-task basis. The division engineer controls all engineer support forward of the LD and coordinates the support on an area basis.

(5) Until committed to the fight, divisions and separate armored brigades move behind attacking divisions and over routes that have been cleared by lead divisions and maintained by corps combat engineer groups, combat engineer battalions, and CSE companies. Although the attacking unit's organic engineers clear sudden blockages along march routes, their mass is forward to facilitate rapid handover of obstacle-breached lanes. They conduct a passage of lines after they are committed on the continued attack or penetration.

2-6. Summary.

a. Figure 2-5 outlines the decision-making process for determining a command or a support relationship. It delineates relationships based on the necessary response time to the receiving maneuver element. Command, administrative, and logistical responsibilities remain with the parent engineer unit in a support relationship. The engineer unit commander organizes the unit and suballocates tasks to effective support the maneuver commander's intent. Table 2-1 shows who is responsible for C^2, task organization and assignment, and logistical support. It also shows who reorganizes engineers as infantry, when necessary.

NOTE: Figure 2-5 and Table 2-1 are quick reference charts that were designed for use during this correspondence course, and they can be used as guides during the task-organization process. They are NOT a substitute for the planning process during the employment of engineers.

b. Command relationships prescribe the chain of command and the degree of authority a commander exercises over an engineer unit. Command authority over engineer units can be given to a maneuver commander when he requires immediately responsive engineer forces. Attachment, OPCON, and OPCOM are the primary command relationships used at division level and below. These relationships are well-suited for fluid situations, such as exploitations and pursuit. Ultimately, task organizations are based on mission and not on habitual association. Habitual association is training relationship and does not preclude task organization that allows the most efficient use of available engineer elements.

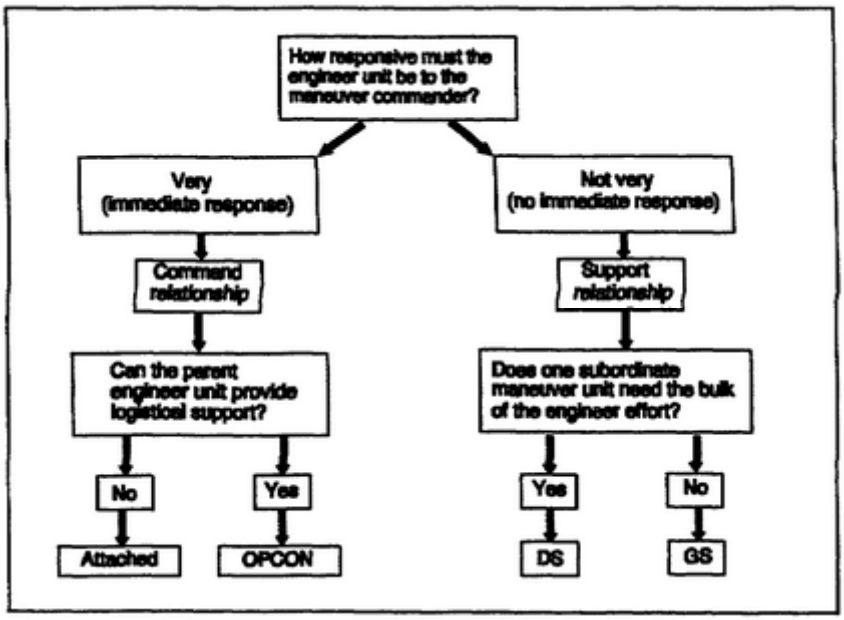

Figure 2-5. Command and support relationships.

Table 2-1. Engineer support.

Type of Support	Command and Organization	Task Assignment	Logistical Suppport	Reorganization as Infantry
Attached	Supported unit	Supported unit	Supported unit	Supported unit
OPCON	*Supported unit*	*Supported unit*	*Parent unit*	Supported unit
Direct[1]	Parent unit	Supported unit	Parent unit	Parent unit
General	Parent unit	Parent unit[2]	Parent unit	Parent unit

[1]The engineer commander retains the authority to further allocate engineer support to the maneuver.
[2]Although this is the normal arrangement, support can be obtained from the supported unit with prior coordination.

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LESSON 2

PRACTICE EXERCISE

The following items will test your grasp of the material covered in this lesson. There is only one correct answer for each item. When you complete the exercise, check your answer with the answer key that follows. If you answer any item incorrectly, restudy the part of the lesson that contains the portion involved.

1. List the possible command relationships that an engineer unit might experience and briefly describe the command and logistical responsibilities of each.

2. Describe the possible support relationships and the concept of centralized versus decentralized control.

3. Discuss the maneuver commander’s authority in respect to command and support relationships with the engineer unit.

LESSON 2

PRACTICE EXERCISE

ANSWER KEY AND FEEDBACK

Item Correct Answer and Feedback

1. The command relationships that an engineer unit might experience include-

- Organic. Organic units are a permanent part of a larger unit. The parent unit exercises full C^2 over them. Division engineer battalions and separate brigade engineer companies are organic to the parent unit.

- Assigned. Assigned units are under the C^2 of a higher headquarters (usually above division level) on a relatively permanent basis. Engineer units of an ENCOM are assigned to the theater army.

- Attached. Attached units are under the C^2 of a gaining commander unless limitations are imposed by the attachment order. The commander's authority and responsibility is the same as that for organic and assigned units, except personnel transfer and promotion remain under the units parent organization. The gaining commander is also responsible for logistical support of the attached engineer unit.

- OPCON. OPCON units are under the gaining commanders C^2, and the parent unit retains responsibility for administrative and logistical support. The gaining commander can use the engineer unit as he would attached engineers without the burden of making logistical arrangement. Within NATO, an allied formation commander does not have the authority to assign separate employment of OPCON engineer-unit components from another national army. An engineer unit that is OPCON to an allied formation cannot be task-organized by the formation commander.

- OPCOM. OPCOM units are under the US unified or specified commander's C^2, and the parent unit retains responsibility for administrative and logistical support. In NATO, OPCOM gives a commander the authority to assign missions or tasks, deploy units, reassign forces, and retain or delegate operational and tactical control.

(page 2-2, para 2-1)

Item Correct Answer and Feedback

2. Support relationships show the manner of support a commander receives. Command, administrative, and logistical responsibilities remain with the parent engineer unit.

- DS. Engineers in a DS relationship provide dedicated support to a specific unit. The supported commander assigns tasks directly to the engineer unit, and these tasks have priority over those from its parent headquarters. Command, administrative, and logistical responsibilities remain with the parent engineer unit, which employs engineer subunits to efficiently accomplish mission tasks. A DS relationship precludes further task organization of the engineer unit by the supported maneuver commander.

- GS. Engineers in a GS relationship provide support to the force on an area basis instead of providing support to a specific unit. Units request support through the area commander on a task-by-task basis. The commander then establishes priorities and assigns the task to an engineer unit.

- Centralized and decentralized control. A discussion of offensive and defensive considerations is necessary to better understand centralized and decentralized forms of control.

  - Offensive. Mobility is the primary offensive engineer function, so most division engineers are task-organized in command relationships with forward elements. The leading TFs of both the main-effort brigade and its supporting brigades usually receive a division engineer battalion. This battalion is almost totally oriented on mobility and rapid breaching and assault support. Its assets provide countermobility obstacles that protect the maneuver force's flank.

  - Defensive. Maneuver forces can use a mobile or an area defensive scheme or a combination of both, depending on METT-T factors. Engineer operations differ based on the selected pattern.

(page 2-2, para 2-2)

3. A maneuver commander cannot assign a more authoritative command relationship than he receives from a higher authority. He may assign a less authoritative relationship to further attach to, place under OPCON to, or give a support mission for a subordinate headquarters to an engineer unit attached to him. The maneuver commander may further place under OPCON to or give a support mission for a subordinate headquarters to an engineer unit OPCON to him. The commander may give tasks and priorities to an engineer unit in direct support to him, but he cannot task-organize it or give it to a subordinate headquarters.

(page 2-5, para 2-3)

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LESSON 3

CONTROL OF ENGINEER ELEMENTS

Critical Task: 01-2250-20-1003

OVERVIEW

LESSON DESCRIPTION:

This lesson addresses the set up and application of C^2 measures at battalion and TF level. It also describes how the division engineer company uses a TAC, a TOC, and a unit trains CP to perform its mission.

TERMINAL LEARNING OBJECTIVE:

ACTION: You will identify procedures used by engineer offices to monitor and control engineer unit actions during the mission. You will also identify the process used to recommend necessary adjustments when task-organizing engineer elements during the mission.

CONDITION: You will be given the material contained in this lesson.

STANDARD: You will correctly answer all questions on the practice exercise at the end of this lesson.

REFERENCES: The material contained in this lesson was derived from FMs 5-71-100,5-100, and 101-5 and from other material approved by the USAES.

INTRODUCTION

When task-organized to a TF, the division engineer company commander is the TF commander's engineer. He integrates TF engineers into the combined-arms team and executes engineer missions assigned to the TF and the division engineer company. The division engineer company commander advises the TF commander on engineer battlefield mission activities within the TF sector. C^2 plays a major part in the TF engineer's mission.

Monitoring and controlling engineer elements during mission execution is a C^2 function (Figure 3-1, page 3-2).

The maneuver commander at each echelon uses his headquarter to control the overall operation of his forces. He relies on engineer C^2 elements to ensure that engineer units successfully execute the tasks assigned to them.

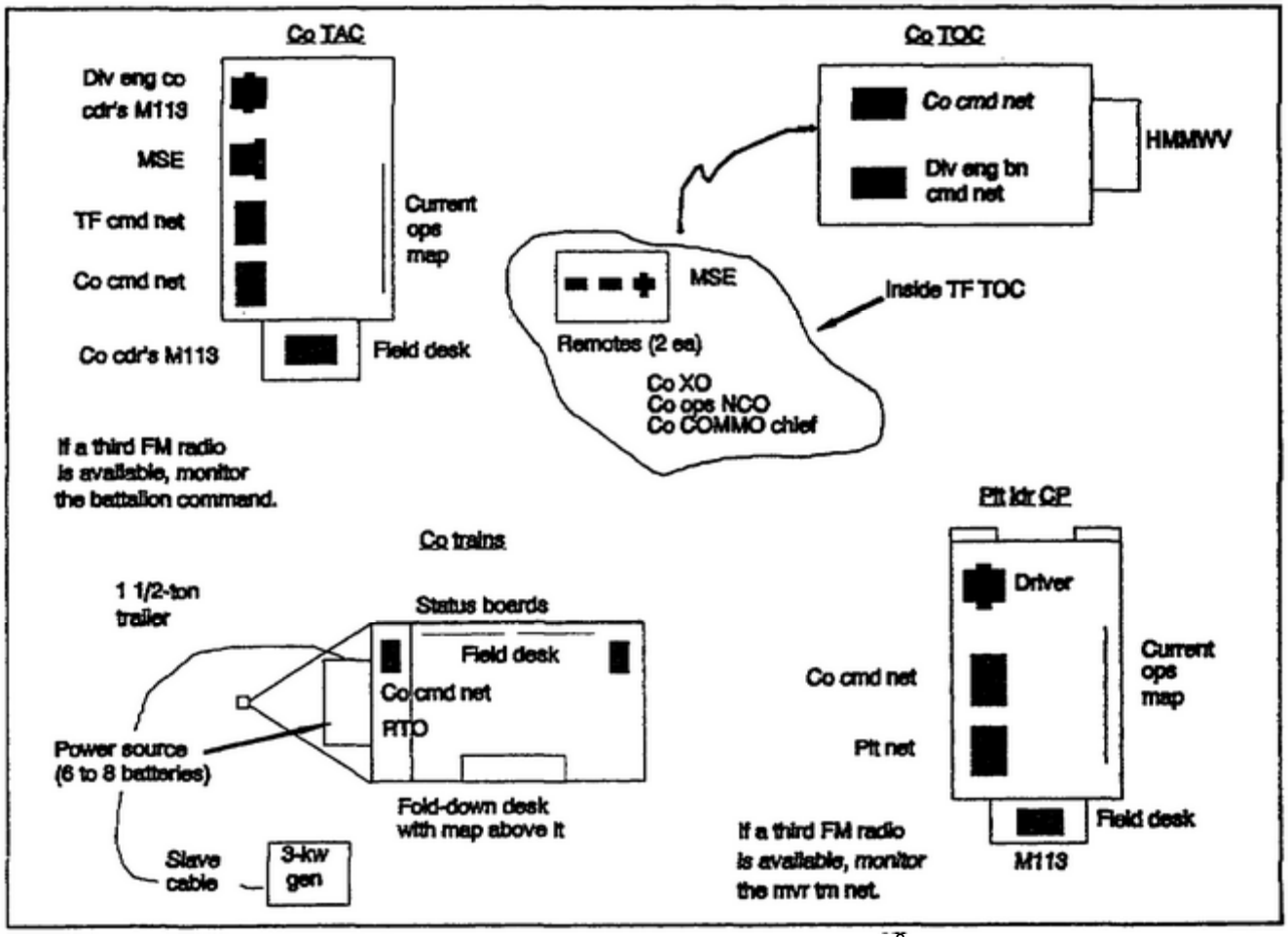

Figure 3-1. Division engineer company C^2 elements.

3-1. Division Engineer Company C^2. Each division engineer company sets up a TAC, a TOC, and a unit trains CP to achieve C^2.

a. TAC. The division engineer company TAC (Figure 3-2) is very mobile and usually collocates with the TF TAC so it can control the fight or the operation.

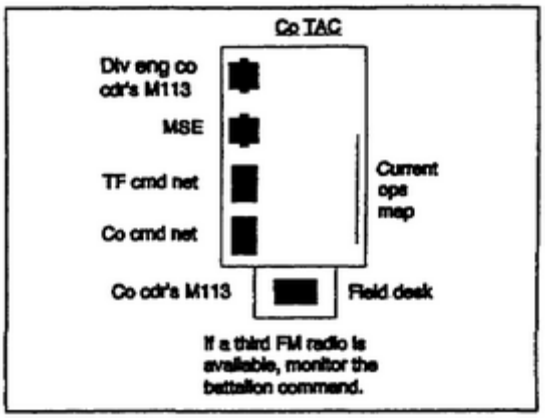

Figure 3-2. Company TAC.

(1) Principal members.

(a) Company commander. The division engineer company commander is responsible for integrating engineers into the combined-arms team. He must perform engineer missions assigned to the TF and his company. He is the commander of the division engineer company and a member of the maneuver force staff. The division engineer company commander must be highly mobile and integrate his activities at all levels to perform both missions.

- As a commander, he is responsible for the company's men, equipment, and mission. He is also responsible for training, tactical employment, and logistical operations of the company. He must know the capabilities of his company's equipment and weapons and know how to tactically employ them. He must clearly and concisely convey orders to subordinates.

- In the staff role, he must clearly and concisely articulate his unit's capabilities to the supported maneuver commander. This requires a thorough understanding of the command and the engineer-estimate process and how to use them.

(b) Nuclear, biological, chemical (NBC) sergeant. The NBC sergeant works in the company TAC with the operations sergeant and the commander. He plans and conducts NBC operations. He is responsible for the organization and training of the company's NBC teams and supervises the execution of assigned tasks as required. He also supervises the maintenance and the employment of the company's NBC equipment. He relays NBC reports, advises the commander on areas of contamination, and maintains the radiation status chart.

(2) Primary functions.

- Directs TF engineer operations.

- Tasks division engineer platoons.

- Synchronizes engineer actions with maneuver and fire-support elements.

- Directs actions of A&O sections through the A&O platoon leader.

- Solves logistical problems.

- Reports to the assistant brigade engineer (ABE) and the division engineer battalion main.

(3) Secondary functions. (These items are primary functions of the TOC.)

- Tracks current TF operations.

- Develops the order of battle and the situation for subordinate platoons.

b. TOC. Division engineer companies support a maneuver TF in a command or a support relationship. In a command or DS relationship, the division engineer company collocates its TOC (Figure 3-8) with the TF TOC to provide the required engineer representation. In a GS relationship, the company TOC locates where it can best control the work effort. The division engineer company commander can best control engineer operations in the TOC. His company operates 24 hours a day to execute the operation, watch the current fight, and plan the future fight.

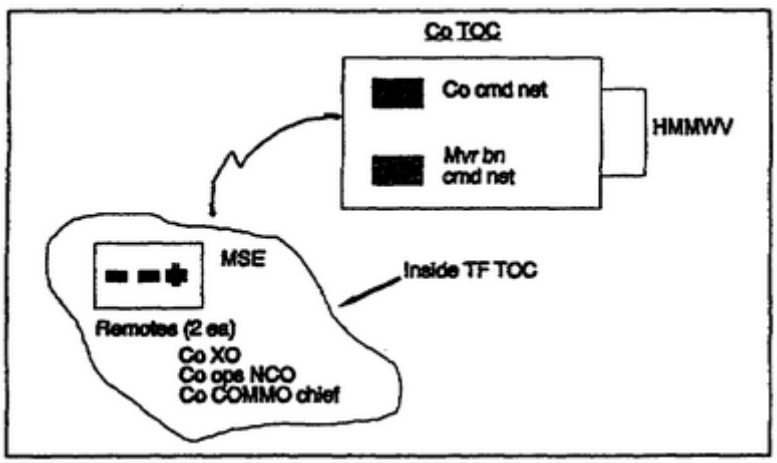

Figure 3-3. Company TOC.

(1) Principal members.

(a) Commander. The commander conducts the reconnaissance and develops the TF mobility, countermobility, and survivability plans that are included in the OPORD.

(b) XO. The XO is second in command of the division engineer company and remains at the TOC to gather and transmit critical information. He serves as the company operations officer and the TOC officer in charge (OIC). He receives guidance from the commander and is responsible for much of the company-level planning. He coordinates combat-support actions and supervises the first sergeant's (1SGs) execution of combat-support actions before the battle. The XO receives

incoming information, analyzes the information, and reports the battle flow to the supported maneuver element. He must know the company plan in detail, anticipate problems, and make independent decisions.

(c) Operations sergeant. The operations sergeant is responsible for the company TOC. He works under the XO's supervision and ensures that the company and the commander are abreast of the supported unit's mission and the tactical situation. He helps the commander prepare plans by gathering and maintaining information, and he reports on the mission status. The operations sergeant is the critical link between the commander who executes company combat operations and the 1SG who executes combat service support (CSS) tasks to support combat operations.

(d) Communications sergeant. The communications sergeant is the company expert and adviser on tactical communications. He installs, operates, and maintains field wire communications, telephones, switchboards, secure communications equipment, and frequency-modulated (FM) radios. He receives, accounts for, and distributes signal operation instructions. The communications sergeant is located at the company TOC and goes forward with essential tools, test equipment, and spare parts to perform essential repair and maintenance of communications equipment as required. He reports the status of critical communications equipment to the company TOC.

(2) Primary functions.

- Tracks current TF operations and passes the information to the company CP.
- Integrates engineers into future operations through planning and input and prepares required annexes.
- Tracks logistics war stoppers and informs the division engineer company commander.
- Relays engineer information to other C^2 elements.
- Develops the order of battle and situation reports for subordinate platoons.
- Gives early warning of future operations to the company CP.
- Alerts division engineer company elements to enemy air and NBC attacks.

- Plans and directs engineer operations (mobility, countermobility, and survivability; MICLIC reload; MICLIC and AVLM delivery; AVLB employment; and obstacle database maintenance).

(3) Secondary functions.

- Relays reports to the ABE and the division engineer battalion main.

- Assumes the direction of engineer support for the close fight if necessary. (This assures continuous C^2 if the TAC cannot monitor the fight.)

c. Unit trains CP. The unit trains CP (Figure 3-4) collocates with the TF combat trains or the division engineer administrative-logistical CP.

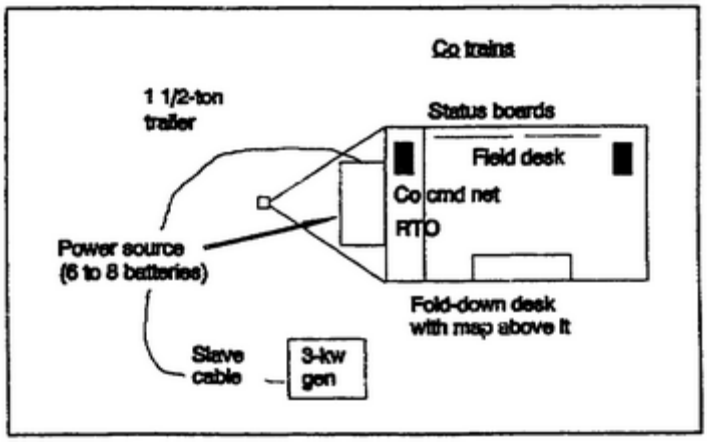

Figure 3-4. Unit trains CP.

(1) Principal members.

(a) 1SG. The division engineer company 1SG is the senior noncommissioned officer (NCO) in the company and is responsible for logistical support. He is also the noncommissioned officer in charge (NCOIC) of the unit trains. The 1SG is the principal adviser to the commander on all enlisted matters, and he performs a myriad of assigned and unassigned duties. He is a role model for the soldiers within the company, and he sets and enforces all standards. The 1SG is the company's CSS executor and coordinator. He supervises the activities of maintenance and supply sergeants in the administrative-logistical operations center (ALOC). He coordinates CSS matters with the engineer battalion or the supported maneuver element. He receives CSS reports from platoons and provides information and status reports to the company XO. The 1SG requisitions and replenishes necessary supplies through the supply sergeant. He monitors the

casualty evacuation system and the actions of the company maintenance and vehicle-recovery teams. He also monitors the logistical status and submits reports to the company XO and the battalion ALOC. During consolidation, the 1SG supervises the actions of the company trains and coordinates resupply through the company XO and the ALOC. He joins the LOGPAC at the LRP and moves it to the company LRP for the engineer platoon sergeant.

(b) Supply sergeant. The supply sergeant requests, receives, issues, stores, maintains, and returns supplies and equipment for the company. He is in charge of the engineer company assets located with the engineer or supported maneuver unit field trains. The supply sergeant prepares and maintains LOGPACs and ensures that they are sent forward and received by the company trains. He is supervised by the 1SG and reports the status of critical supply items to the company TOC.

(2) Primary functions.

- Sustains engineer company operations.
- Troubleshoots logistics support to platoons.
- Coordinates and delivers LOGPACs to platoons.
- Coordinates and provides maintenance support to platoons.
- Coordinates and provides mess support to platoons.
- Processes casualties and enemy prisoners of war from platoons.
- Conducts on-site coordination with TF combat trains.

3-2. Communications.

a. Amplitude-modulated (AM) nets. The engineer battalion headquarters has AM communications capability. AM nets have a large signature and a low density in the division and should only be used when all other means of communication have been exhausted. They are long-range nets; however, enemy intelligence may be able to identify the engineer headquarters from them so take every precaution to limit the transmitted signature. **NOTE: This net will soon be replaced by improved high-frequency radios (IHFRs).**

b. FM nets. Engineers use many FM radio nets on the battlefield. Under the ERI, the supporting division engineer battalion command net replaces the ad hoc engineer operations net when multiple engineer units work in a brigade area. Table 3-1 shows the principal elements of maneuver and division engineer FM nets under the ERI.

Table 3-1. Engineer FM net structure.

Net/ Station	Bde Cmd & Ops Net— Secure	Bde Ops & Intel Net— Secure	Div Eng Bn Cmd Net— Secure	Div Eng Bn A/L Net— Secure	TF Cmd & Ops Net— Secure	Div Eng Co Cmd Net— Secure	Mvr Co & Cmd Net— Secure	Div Eng Plt Net— Secure	Div Eng Co A&O Plt Net— Secure
Div eng bn TAC	●	●	●						
Div eng bn main may monitor	●								
Div eng bn main		●	●	●					
Subordinate eng co TAC and TOC			●						
Div eng bn LOC				●					
Div eng co TAC, TOC, unit trains				●					
Div eng co cdr				●	●	●			
Co XO has access to TF main					●	●			
Co XO at TF main									
Co 1SG						●			
Eng unit trains						●			
Div eng plt ldr						●	●	●	
A&O plt leader						●			
Plt SGT								●	●
Squads (3 ea platoon)								●	
Div eng plt M9 ACEs (2 ea platoon)								●	
Augmented equip (CEV, ACE, and AVLB)								●	
Assault sec chief (2 ea)									●
Obstacle sec chief									●
Eng equip CEVs									●

(a) Division engineer battalion command net-secure (three each division) (Figure 3-5, page 3-10).

- Division engineer battalion TAC.
- Division engineer battalion main-net control station (NCS).
- Division engineer company TAC and TOC.

(b) Division engineer battalion administrative/logistics (A/L) net-secure (three each division) (Figure 3-6, page 3-10).

- Division engineer battalion main-NCS.
- Division engineer battalion logistics operations center (LOC).
- Division engineer company TAGC, TOC, and unit trains as required.

(c) TF command and operations net--secure (Figure 3-7, page 3-10).

- Division engineer company commander.
- Company XO has access to the TF main.

(d) Division engineer company command net--secure (nine each division) (Figure 3-8, page 3-10).

- Division engineer company commander.
- Company XO at the TF main.
- Company 1SG.
- Engineer unit trains.
- Division engineer platoon leader (2 each company net).
- A&O platoon leader.

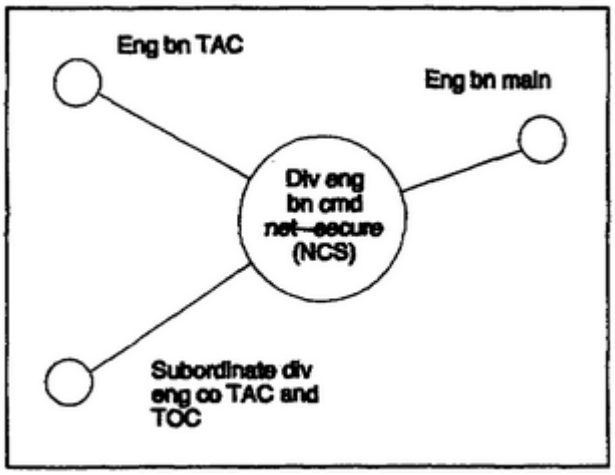

Figure 3-5. Division engineer battalion command net-secure.

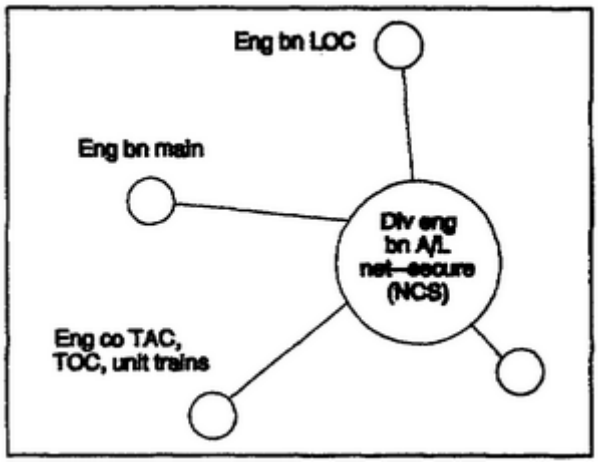

Figure 3-6. Division engineer battalion A/L net-secure.

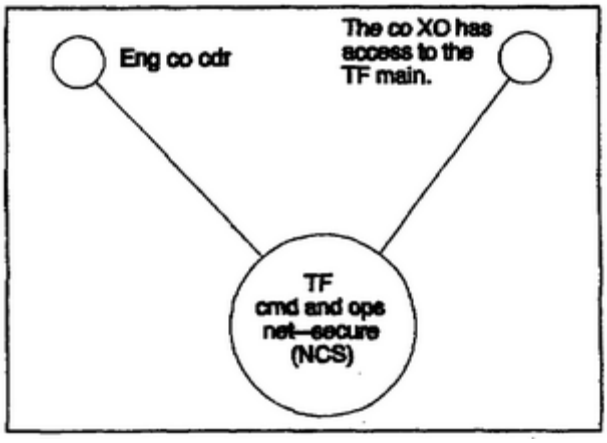

Figure 3-7. TF command and operations net-secure.

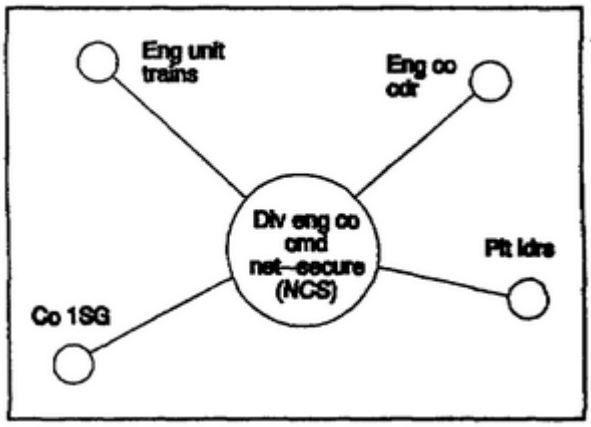

Figure 3-8. Division engineer company command net-secure.

(e) Maneuver company and team command net-secure (as required) (Figure 3-9) includes the division engineer platoon leader.

(f) Division engineer platoon net-secure (Figure 3-10) (18 each division).

- Division engineer platoon leader.
- Platoon sergeant (may be in a platoon high-mobility multipurpose wheeled vehicle (HMMWV) or a squad M113).

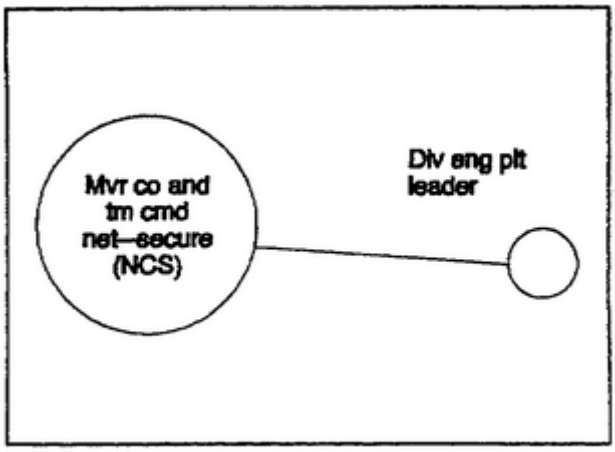

Figure 3-9. Maneuver company and team command net.

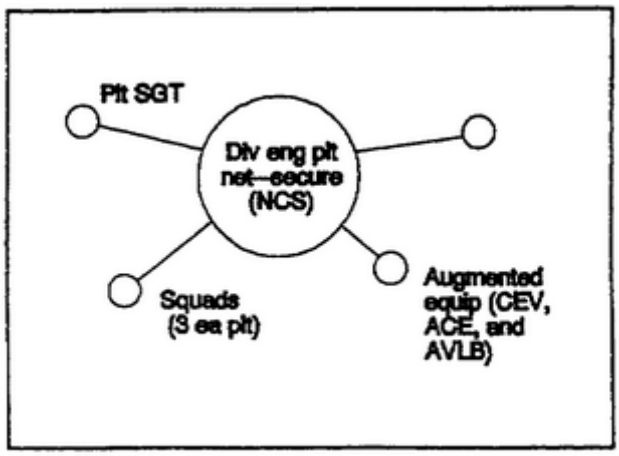

Figure 3-10. Division engineer platoon net-secure.

- Squads (three each platoon net).
- Division engineer platoon M9 armored combat earthmovers (ACEs) (two each platoon net).
- Augmented equipment (CEV, ACE, and AVLB).

(g) Division engineer company A&O platoon net-secure (Figure 3-11) (nine each division).

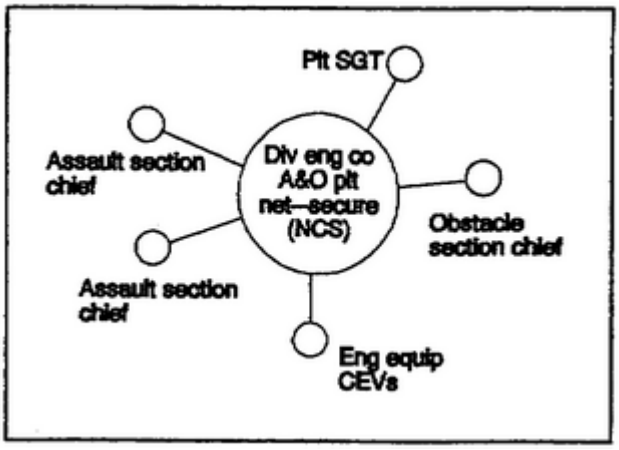

Figure 3-11. Division engineer company A&O platoon net-secure.

- Platoon leader.
- Platoon sergeant.
- Assault section chief (two each).
- Obstacle section chief.
- Engineer equipment (two CEVs, four AVLBs, and two ACEs for each A&O platoon net).

c. Tactical telephone nets. Mobile subscriber equipment (MSE) is a tactical telephone communications system that improves the division's communication capability. Under ERI, division engineer commanders use mobile receivers and transmitters (MSRTs) that allow full-time access to the system. Engineer staffs near a signal node have access to the system via hard-wired telephones. Use of the system include-

(1) Mobile (MSRTs).

- Division engineer.
- Division engineer battalion.
- Division engineer company.

(2) Tactical telephone tied to signal node.

- Division engineer headquarters rear main.
- Division engineer battalion main.
- ABE at brigade main.
- Division engineer battalion ALOC.
- Division engineer company unit trains and TF combat trains in the vicinity.
- TF staff engineer (company XO at TF main) and TF main in the vicinity.

d. Maneuver Control System (MCS).

(1) MCS is a network of computers located from corps to battalion. CPs are linked externally by tactical communications and internally by the local area network (LAN). Information is current, accurate, available to all echelons, and received and disseminated quickly.

(2) As the Army fields automated systems, engineer units will receive MCS hardware that allows access to the same information available to maneuver units. Additionally, engineer-specific software will enable engineer commanders and their staff to develop engineer estimates and report information. MCS is not designed to perform the command function or replace C^2 requirements.

(3) MCS provides a *business-as-usual* tool, and the staff uses it instead of a telephone, pen, paper, and maps. MCS quickly receives, organizes, stores, and sends critical information, and it filters the raw data for decision displays.

3-3. Accurate and Timely Reports. The division engineer company commander or the TF engineer staff officer must set up reporting procedures to further facilitate the control of subordinate elements. He must also establish a time line for measuring progress so the engineer officer can make necessary adjustments to the task organization without delay.

3-4. Reporting System. Set up a system that provides subordinate engineer elements with required reports and information (unit status, mission status, and terrain analysis). Standardize the information into specific report formats.

a. Unit standard operating procedures (SOPs). Review unit SOPs and make additions, deletions, and changes to standardized reports as needed.

b. Methods of communicating reports.

(1) Set up and maintain communication with all engineer elements. Consider all forms of communication (FM radio, radio teletype (RATT), wire, and courier). Communication is essential for transmitting accurate and timely reports.

(2) Use a dedicated net for FM radios. A separate division engineer or brigade engineer net is preferred, but you may have to use the operations net of the largest engineer unit supporting the maneuver force.

(3) Follow up wire and radio reports with periodic hard copy delivered by courier or RATT.

3-5. Time Line.

a. The engineer planner should develop a time line as part of the engineer-estimate process or when writing the engineer annex.

b. Time is always a premium in war; the side that seizes a time advantage over the enemy usually wins. A commander must seize every time-saving expedient and use it to his advantage. He can do this by quickly making clear, reasonable, and correct decisions. The side that makes decisions, issues orders, and translates orders into decisive actions faster than its

opponent gains a valuable time advantage. To gain this advantage, the tactical planner must create and transmit the minimum essential elements of combat orders within the limitations of the available planning time. The goal is to give subordinate units enough time to conduct planning, reconnaissance, preparation, and rehearsal before starting combat operations. It does more harm than good to present the *perfect* plan to subordinates units if they do not have time to send out their own orders and prepare for battle.

c. A good time plan drives the planning process, and reverse planning and ruthless enforcement of the time plan are keys to effective time management. The reverse-planning schedule is the preferred and most widely used technique. It starts with the last known action and progresses backwards to the present (from the time the ID is crossed or the time the defense must be set up). The schedule includes all the unit's major tasks-time of the battle action, time to be set up and ready to defend, battle update briefings, order issuance, reconnaissance, and initial movement.

d. A sample time line is shown in Figure 3-12. Note that one-third of the time is spent on planning and two-thirds on preparation.

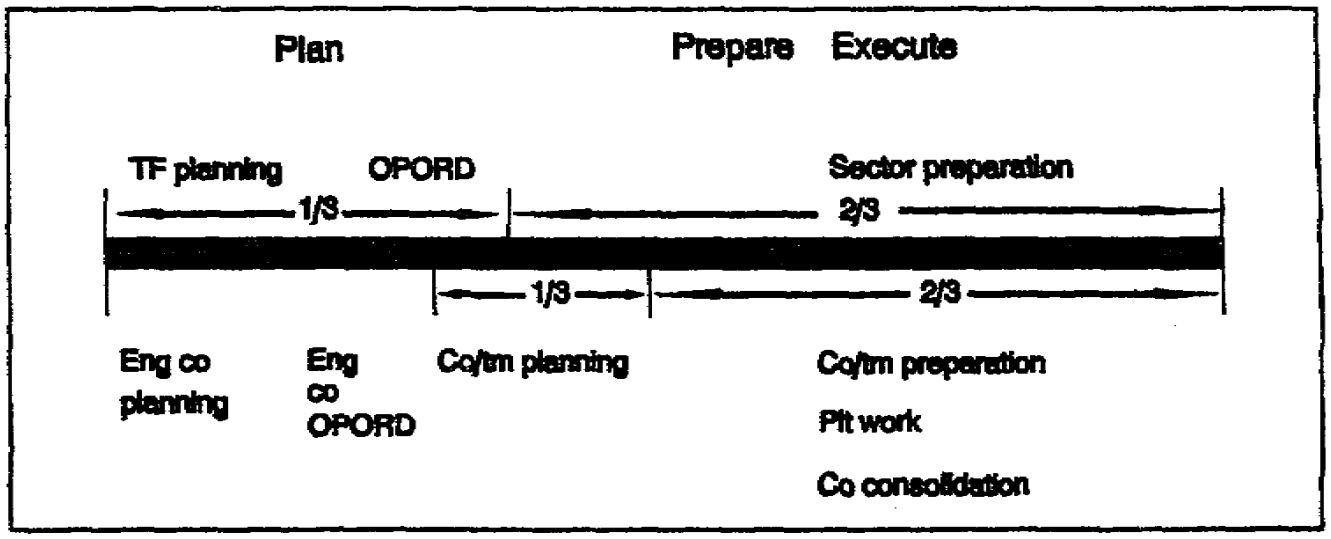

Figure 3-12. Sample time line.

3-6. Task Organization and Mission Assignment. If performance does not follow the projected course, the TF engineer must observe engineer organizational principles and the task-organization process to recommend changes in the task organization or mission assignments.

3-7. Summary. This lesson addressed-

- C^2 measures used to control mission progress at the battalion and TF levels.
- The requirement to adjust task organization a necessary once the mission is underway.
- Personnel and functions of the TAC, the TOC, and the unit trains CP.
- Procedures used by the engineer officer to monitor and control engineer unit actions.
- Methods for recommending necessary adjustments to the task organization of engineer elements during the mission.

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LESSON 3

PRACTICE EXERCISE

The following items will test your knowledge of the material covered in this part of the subcourse. When you have completed the exercise, check your answer with the key that follows. If you answer any item incorrectly, study again that part which contains the portion involved.

1. Describe the responsibilities of a division engineer company commander who is performing his mission as a TF engineer.

2. List the primary functions and the principal members of a division engineer company TAC.

3. List the primary functions and the principal members of a company TOC.

4. List the primary functions and the principal members of a unit trains CP.

5. List the communication nets operated by a division engineer company.

LESSON 3

PRACTICE EXERCISE

ANSWER KEY AND FEEDBACK

Item — Correct Answer and Feedback

1. The division engineer company commander is responsible for integrating engineers into the combined-arms team. He must perform engineer missions assigned to the TF and his company. He is the commander of the division engineer company and a member of the maneuver force staff. The division engineer company commander must be highly mobile and integrate his activities at all levels to perform both missions.

   - As a commander, he is responsible for the company's men, equipment, and mission. He is also responsible for training, tactical employment, and logistical operations of the company. He must know the capabilities of his company's equipment and weapons and know how to tactically employ them. He must clearly and concisely convey orders to subordinates.
   - In the staff role, he must clearly and concisely articulate his units capabilities to the supported maneuver commander. This requires a thorough understanding of the command and the engineer-estimate process and how to use them.

   (page 3-3, para 3-la(l)(a))

2. Primary functions of a division engineer company TAC:

   - Directs TF engineer operations.
   - Tasks division engineer platoons.
   - Synchronizes engineer actions with maneuver and fire-support elements.
   - Directs actions of A&O sections through the A&O platoon leader.
   - Solves logistical problems.
   - Reports to the ABE and the division engineer battalion main.

   Principal members of a division engineer company TAC:

   - Company commander.
   - NBC sergeant.

   (page 3-3, para 3-la(1)2))

Item Correct Answer and Feedback

3. Primary functions of a company TOC:

- Tracks current TF operations and passes the information to the company CP.
- Integrates engineers into future operations through planning and input and prepares required annexes.
- Tracks logistics war stoppers and informs the division engineer company commander.
- Relays engineer information to other C^2 elements.
- Develops the order of battle and situation reports for subordinate platoons.
- Gives early warning of future operations to the company CP.
- Alerts division engineer company elements to enemy air and NBC attacks.
- Plans and directs engineer operations (mobility, countermobility, and survivability; MICLIC reload; MICLIC and AVLM delivery; AVLB employment; and obstacle data-base maintenance).

Principal members of a company TOC:

- Commander.
- XO.
- Operations sergeant.
- Communications sergeant.

(page 3-4, para 3-1b(1)(2))

4. Primary functions of a unit trains CP:

- Sustains engineer company operations.
- Troubleshoots logistics support to platoons.
- Coordinates and delivers LOGPACs to platoons.
- Coordinates and provides maintenance support to platoons.
- Coordinates and provide mess support to platoons.
- Processes casualties and enemy prisoners of war from platoons.
- Conducts on-site coordination with TF combat trains.

Item Correct Answer and Feedback

Principal members of a unit trains CP:

- 1SG.
- Supply sergeant.

(page 3-6, para 3-1c)

5. The following communication nets are operated by a division engineer company:

- Division engineer battalion command net-secure.
- Division engineer battalion A/L net-secure.
- TF command and operations net-secure.
- Division engineer company command net-secure.
- Maneuver company and team command net.
- Division engineer platoon net-secure.
- Division engineer company A&O platoon net--secure.

(page 3-8, para 3-2b)